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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEE YEAN NG

Appeal 2008-6012
Application 10/803,266
Technology Center 2800

Decided: January 22, 2009

Before CHARLES F. WARREN, TERRY J. OWENS, and
KAREN M. HASTINGS, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

The Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-20, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

The Invention

The Appellant claims a device and method for emitting composite output light. Claims 1, 8 and 14 are illustrative:

1. A device for emitting composite output light, said device comprising:

a light source that emits original light, the light source including a fluorescent layer having a property to convert some of said original light into first converted light; and

a wavelength-conversion region optically coupled to said light source to receive some of said original light and said first converted light, said wavelength-conversion region including a fluorescent material having a property to convert some of said original light into second converted light, said original light, said first light and said second converted light being components of said composite output light.

8. A method for emitting composite output light, said method comprising;

generating original light within a light source;
converting some of said original light into first converted light within said light source;
converting some of said original light into second converted light outside of said light source; and
emitting said original light, said first converted light and said second converted light as components of said composite output light.

14. A device for emitting composite output light, said device comprising;

a semiconductor die that emits first light of a first peak wavelength, said semiconductor die including a fluorescent substrate having a property to convert some of the first light into second light of second peak wavelength; and

a wavelength-conversion region positioned to receive at least some of said first light and said second light, said wavelength-conversion region having a property to convert some of said first light into third light of a third peak wavelength, said first light, said second light and said third light being components of said composite output light.

The Reference

Takahashi

2002/0043926 A1

Apr. 18, 2002

The Rejection

Claims 1-20 stand rejected under 35 U.S.C. § 102(b) over Takahashi.

OPINION

The Examiner's rejection is affirmed as to claims 1-13 and reversed as to claims 14-20. Because our rationale regarding the affirmance is substantially different than that of the Examiner, we denominate the affirmance as involving a new ground of rejection under 37 C.F.R. § 41.50(b). We introduce a new ground of rejection of claim 14 under 37 C.F.R. § 41.50(b), and leave it to the Examiner to address claim 14's dependent claims 15-20.

Rejection of claims 1-13

Among claims 1-13 the Appellant argues only the independent claims, i.e., claims 1 and 8 (Br. 4-7). We therefore limit our discussion to those claims. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007).

“Anticipation requires that every limitation of the claim in issue be disclosed, either expressly or under principles of inherency, in a single prior art reference.” *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1255-56 (Fed. Cir. 1989).

Claim 1

Issue

Has the Appellant shown reversible error in the Examiner's determination that Takahashi discloses, expressly or inherently, the use of a fluorescent layer in combination with a wavelength-conversion region including a fluorescent material?

Findings of Fact

Takahashi discloses “a light-emitting unit constituted by a combination of a light-emitting device and a fluorescent material” (¶ 0002). “[A] part of the light emitted from the light-emitting device is subjected to

wavelength conversion by the fluorescent material” (¶ 0062). In one embodiment the light emitting device (10) is mounted into a cup portion (33) that is filled with a plurality of layers of an epoxy resin (fluorescent resin 35) containing differing concentrations of fluorescent materials (36) (¶¶ 0079, 0080, 0083). In another embodiment a fluorescent layer (37) containing fluorescent materials (36) covers either the light emitting device’s substrate surface or both the substrate surface and side surfaces “so that the fluorescent resin 35 can be omitted” (¶¶ 0097, 0098; Figs. 6A, 6B).

Analysis

The Examiner relies upon Takahashi’s fluorescent layer 37 containing fluorescent materials 36 as corresponding to the Appellant’s fluorescent layer, and Takahashi’s fluorescent resin 35 containing fluorescent materials 36 as corresponding to the Appellant’s wavelength-conversion region including a fluorescent material (Ans. 3). The Examiner argues that Takahashi’s disclosure that fluorescent resin 35 “can be omitted” (¶ 0097) indicates that fluorescent resin 35 can be present along with fluorescent layer 37 (Ans. 7).

The Appellant argues that Takahashi’s disclosure that fluorescent resin 35 can be omitted implies that fluorescent layer 37 replaces fluorescent resin 35 (Br. 5).

Takahashi’s disclosures that “a fluorescent layer 37 ... maybe [sic] provided ... so that the fluorescent layer 35 can be omitted” (¶ 0097) and that fluorescent layer 37 contains fluorescent materials 36 (¶¶ 0097, 0098) indicate that fluorescent layer 35, which is an epoxy (¶¶ 0080, 0083), can be omitted such that instead of the fluorescent materials 36 being in that epoxy, they are part of fluorescent layer 37.

Thus, that Examiner has not established that Takahashi discloses, expressly or inherently, the use of fluorescent layer 35 and fluorescent layer 37 in combination.

However, in Takahashi's embodiment wherein a plurality of fluorescent resin 35 layers has a concentration gradient of fluorescent materials 36 (§ 0083), an inner layer corresponds to the Appellant's fluorescent layer and the next layer corresponds to the Appellant's wavelength-conversion region including fluorescent material. Takahashi indicates that the original light that is not wavelength converted in the inner layer passes through that layer to the next layer (§ 0062). Takahashi's disclosure that part of the light that enters a layer is wavelength converted and part passes through that layer unconverted, *see id.*, indicates that part of the original light that enters Takahashi's second layer is wavelength converted as required by the Appellant's claim 1. As required by the Appellant's claim 1, the composite output light comprises the light that is wavelength converted in the inner layer, the light that is wavelength converted in the next layer, and original light that passes through the layers.

Conclusion of Law

The Appellant has not shown reversible error in the Examiner's determination that Takahashi discloses, expressly or inherently, a fluorescent layer in combination with a wavelength-conversion region including a fluorescent material. Because our rationale differs substantially from that of the Examiner, we denominate the affirmance of claim 1 and its dependent claims 2-7 as involving a new ground of rejection under 37 C.F.R. § 41.50(b).

Claim 8

Issue

Has the Appellant shown reversible error in the Examiner's determination that Takahashi discloses, expressly or inherently, converting some of the original light into first converted light within the light source and converting some of the original light into second converted light outside the light source?

Analysis

As in the rejection of claim 1, the Examiner's rejection of claim 8 is based upon the combination of Takahashi's fluorescent resin 35 and fluorescent layer 37 (Ans. 8). As pointed out above regarding the rejection of claim 1, that combination does not appear to be disclosed by Takahashi.

The Appellant argues that Takahashi does not disclose converting some of the original light into first converted light within the light source and converting some of the original light into second converted light outside the light source (Br. 6-7).

The Appellant's fluorescent layer for converting light within the light source is the fluorescent substrate 112 of LED die 102 which includes an active layer 114 that generates light (Spec. 4:14-19). Claim 8 does not require a fluorescent substrate but, rather, requires converting some of the original light into first converted light within the light source. In Takahashi's embodiment having a plurality of fluorescent resin 35 layers with a concentration gradient of fluorescent materials 36 (§ 0083), the inner layer is adjacent to the light emitting device (10) similarly to the Appellant's fluorescent substrate 112 being adjacent to active layer 114 that generates light (Spec. 4:17-25; Figs. 1, 2). The Appellant's claim 8 does not exclude,

as a light source, a light emitting device having a fluorescent layer thereon. Hence, Takahashi's inner fluorescent resin layer 35 reasonably can be considered "within said light source" as that term is used by the Appellant. Light converted in Takahashi's next fluorescent resin 35 layer, which is outside the inner layer, corresponds to the Appellant's conversion of original light to second converted light outside the light source.

Conclusion of Law

The Appellant has not shown reversible error in the Examiner's determination that Takahashi discloses, expressly or inherently, converting some of the original light into first converted light within the light source and converting some of the original light into second converted light outside the light source. Because our rationale differs significantly from that of the Examiner, we denominate the affirmance of claim 8 and its dependent claims 9-13 as involving a new ground of rejection under 37 C.F.R. § 41.50(b).

Rejection of claim 14

Issue

Has the Appellant shown reversible error in the Examiner's determination that Takahashi discloses, expressly or inherently, a semiconductor die including a fluorescent substrate to convert some of first light into second light, and a wavelength-conversion region positioned to receive at least some of the first light and the second light?

Analysis

The Examiner relies upon Takahashi's fluorescent layer 37 (¶¶0097, 0098) as corresponding to the Appellant's fluorescent substrate, and

Takahashi's fluorescent resin 35 as corresponding to the Appellant's wavelength conversion region (Ans. 5-6).

The Appellant argues that Takahashi does not disclose the combination of fluorescent resin 35 and fluorescent layer 37 (Br. 7-8).

As pointed out above regarding the rejection of claim 1, Takahashi does not appear to disclose the use of fluorescent resin 35 and fluorescent layer 37 in combination.

Conclusion of Law

The Appellant has shown reversible error in the Examiner's determination that Takahashi discloses, expressly or inherently, a semiconductor die including a fluorescent substrate to convert some of first light into second light, and a wavelength-conversion region positioned to receive at least some of the first light and the second light.

New ground of rejection

Under 37 C.F.R. § 41.50(b) we enter the following new ground of rejection.

Claim 14 is rejected under 35 U.S.C. § 103 over Takahashi.

Takahashi discloses, in one embodiment, that the surface of the substrate (11) of a light-emitting device (10) that includes semiconductor layers (13, 15) can be covered with a fluorescent layer (37) (¶ 0097, Fig. 6A). Because fluorescent layer 37 covers the bottom of substrate 11, it is either part of the substrate or also functions as a substrate.

Takahashi discloses, in another embodiment, that light-emitting device 10 can be covered with a plurality of fluorescent resin (35) layers having a concentration gradient of fluorescent materials (36) (¶ 0083). Any

of those layers corresponds to the Appellant's wavelength-conversion region.

Takahashi does not disclose the use, in combination, of fluorescent layer 37 and the plurality of fluorescent resin 35 layers having a concentration gradient of fluorescent materials 36. However, Takahashi would have led one of ordinary skill in the art, through no more than ordinary creativity, to use that combination to obtain the combined benefit of each component, i.e., fluorescence from both fluorescent layer 37 below light-emitting device 10 (Fig. 6A) and fluorescent resin 35 having a concentration gradient of fluorescent materials 36 around the sides and above that light emitting device (Fig. 1). *See KSR Int'l. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (In making an obviousness determination one "can take account of the inferences and creative steps that a person of ordinary skill in the art would employ"). In that combination, the wavelength-conversion region (plurality of fluorescent resin 35 layers having a concentration gradient of fluorescent materials 36) would receive at least some of the light converted by fluorescent layer 37 (compare Figs. 1 and 6A).

Hence, the use, in combination, of Takahashi's fluorescent layer 37 and plurality of fluorescent resin 35 layers having a concentration gradient of fluorescent materials 36 would have been prima facie obvious to one of ordinary skill in the art.

We leave it to the Examiner to address claim 14's dependent claims 15-20.

DECISION/ORDER

The rejection of claims 1-20 under 35 U.S.C. § 102(b) over Takahashi is affirmed as to claims 1-13, and is reversed as to claims 14-20. Under 37 C.F.R. § 41.50(b), the affirmance is denominated as involving a new ground of rejection and new ground of rejection of claim 14 is entered.

It is ordered that the Examiner's decision is affirmed-in-part.

This decision contains a new ground of rejection pursuant to 37 CFR § 41.50(b) (2007). 37 CFR § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 CFR § 41.50(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

(2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART, 37 C.F.R. § 41.50(b)

tc

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